REMARKS

This is a simultaneous amendment with request for continued examination filed in response to the final Office Action dated January 15, 2009.

I. CLAIM CHANGES

The upper limit for the SiO_2 content in the claimed X-ray opaque glass has been reduced from 98 mol % to 92 mol % in all independent claims including claim 42 and 81.

In addition, new dependent claims 84 to 86 further limit the amount of SiO_2 in the claimed glass compositions of claims 38, 42, and 81 to a maximum amount of 88.1 wt. %.

The amounts of SiO_2 in each of examples 23 to 35 in Table 1 on page 24 of the applicants' originally filed specification support the changes of the upper limits for SiO_2 in the applicants' independent claims. The amounts of SiO_2 in each of examples 6, 7, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, and 22 on pages 23 and 24 of applicants' specification support the reduced amounts of SiO_2 in the embodiments claimed in the new dependent claims 84 to 86. These changes are acceptable under the U.S. Patent Office policy for making changes in range limitations set forth in M.P.E.P. 2163.05 III and the *In re Wertheim* decision.

For the aforesaid reasons the amended and new claims should not be rejected on formal grounds under 35 U.S.C. 112.

II. OBVIOUSNESS BASED ON ANDERSON ALONE

Claims 38, 40 to 47, and 81 were rejected under 35 U.S.C. 103 (a) over U.S. Patent 6,800,574 issued to Anderson.

Applicants' claim 38 is a highly limited claim for a glass composition that must contain SiO_2 and Yb_2O_3, with or without ZrO_2. The same is true of the glass powder claim 49. Claim 81 and some of the other independent claims cover a glass composition that must contain SiO_2 and Yb_2O_3 but which may optionally contain other inorganic oxide ingredients and fluoride.

Anderson discloses and claims a **generic** glass bead composition that contains more than 85 wt. % of silica, an active rare earth dopant (one that provides light emission in response to excitation – column 3, lines 17 to 19) and a modifying dopant (abstract, claim 1, column 2, lines 19 to 24). Furthermore in the case of preferred embodiments the glass bead composition contains **20 to 90 mol %** of a **non-oxide** anion, such as chloride (column 2, lines 35 to 40). Yb is disclosed as one of about 13 possible cations for inclusion in the glass bead but the references does not limit the additive in the glass bead to Yb_2O_3 and further it would much more likely be $YbCl_3$ if it were added as a dopant. The only rare earth dopant included in the glass beads in examples 1 to 24 is erbium chloride, which is not ytterbium (Yb) and not an oxide.

The preferred method of making the glass beads of Anderson is entirely different from the applicants' method, which preferably comprises high temperature

melting of a glass batch including the required metal oxides (see pages 9 to 12 of applicants' originally filed specification). Only oxides are combined according to applicants' claims with the exception of a small amount of fluoride in the case of some claims. Anderson one the other hand teaches a wet chemistry method as disclosed in column 6, lines 42 to 51. Glass precursor compounds, such as silicon halides, alkoxysilanes, siloxanes (for silica) and soluble rare earth halides and mixed with water or acid to form an aqueous solution and then converted to a powder, for example by a sol-gel process, and in some cases subsequently heated.

However Yb_2O_3 is not soluble in water or organic solvents. Thus Anderson would add Yb in the form of a water soluble halide because it is easier to dissolve. Anderson does not have any reason to require that the only anion present is an oxide ion because Anderson is only concerned with the optical and spectroscopic properties of the Yb cation.

Furthermore Yb_2O_3, a required ingredient of applicants' claimed glass compositions, is never explicitly mentioned anywhere in the disclosure of Anderson. Furthermore no example in columns 11 to 17 contains any Yb in any form. There is no mention of Yb in a single sentence as a preferred dopant cation and it is only mentioned as one of a large number of such dopants.

In other words, Anderson discloses a broad generic glass composition, while applicants' disclose and claim a narrow species of the disclosed generic glass composition of Anderson.

However a broad generic disclosure does **not** necessarily establish a case of *prima facie* obviousness of a narrow species. In the case of the presently claimed X-

ray opaque glass compositions it is respectfully submitted that the disclosures of Anderson do not establish a case of *prima facie* obviousness of any of applicants' amended and new claims. The situation described in the second paragraph of M.P.E.P. 2144.05 I appears to apply here. The Anderson reference teaches a glass bead composition with millions of possible ingredient compounds including any possible anion together with thousands of possible combinations of metal cations. Anderson never mentions Yb_2O_3 or any other oxide of Yb. An especially the preferred embodiments and examples lead one skilled in the art away from a glass bead composition containing Yb_2O_3. The preferred sol-gel method of making the glass beads would lead one to add a soluble $YbCl_3$, not Yb_2O_3. The only rare earth cation used in the examples of Anderson is an erbium cation.

Accordingly it is respectfully submitted the Anderson does not establish a case of *prima facie* obviousness of amended glass composition claims 38, 40 to 47 and 81, because the specific teachings in Anderson lead one skilled in the art away from the specific narrow species claimed in applicants' claims (see also M.P.E.P. 2144.08).

Furthermore the claims have now been amended so that the concentration range for SiO_2 in applicants' independent claims including claims 38, 42 and 81 (which are drafted with exclusionary "consisting of" wording) **no longer overlaps or touches** the closest prior art concentrations and concentration ranges for SiO_2 disclosed in Anderson. In order to provide glass compositions for dental applications in which the X-ray absorption properties are optimized the amounts of SiO_2 in the

glass beads should be lower than the amounts of SiO_2 according to Anderson and especially the amounts of Yb_2O_3 should be larger.

The claimed solid glass beads of Anderson must contain **more than** 80.5 wt. % of SiO_2 according to claims 8 and 11. Claim 1 of Anderson requires **more than** 85 wt. % of SiO_2.

The broadest concentration range of SiO_2 disclosed in Anderson is **greater than** 80 wt. % (abstract, and column 2, lines 19 to 21). Also see column 3, line 49, to column 4, line 2, of Anderson.

Concentrations of the various oxide ingredients in applicants' examples 6, 7, 8, 9, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35 were converted from mol % units to wt. % units according to elementary chemical principles. The results are shown in the following amendment tables. Of course these tables show that the applicants' glass compositions with 92 mol % contain at most 79.3 wt. % of SiO_2 (example 25).

Composition of Applicants' Ex. 6, 7, 8 and 9 (spec, pages 23 and 24)

	6		7		8		9	
Component	mol %	wt. %	mol %	wt. %	mol %	wt. %	mol %	wt. %
SiO_2	88.1	65.2	88.1	55.9	92.0	70.3	93.8	81.2
Yb_2O_3	5.0	24.3	10.1	41.6	5.0	25.0	2.0	11.3
ZrO_2	6.9	10.5	1.9	2.5	3.0	4.7	4.2	7.5

Composition of Applicants' Ex. 23, 24, 25 and 26 (spec, pages 23 and 24)

	23		24		25		26	
Component	mol %	wt. %	mol %	wt. %	mol %	wt. %	mol %	wt. %
SiO_2	92.0	76.4	92.0	68.2	92.0	79.3	92.0	78.2
Yb_2O_3	0.1	0.5	0.1	0.5	0.1	0.6	0.1	0.5
ZrO_2	3.0	5.1	3.0	4.6	3.0	5.6	3.0	5.2
Nb_2O_5	4.9	18.0						
Ta_2O_5			4.9	26.7				
HfO_2					4.9	14.8		
WO_3							4.9	16.5

Composition of Applicants' Ex. 27, 28, 29 and 30 (spec, pages 23 and 24)

	23		24		25		26	
Component	mol %	wt. %	mol %	wt. %	mol %	wt. %	mol %	wt. %
SiO_2	92.0	73.4	92.0	78.5	92.0	73.9	92.0	69.0
Yb_2O_3	0.1	0.5	0.1	0.6	2.0	10.5	2.0	9.8
ZrO_2	3.0	4.9	3.0	5.2	3.0	4.9	3.0	4.6
Nb_2O_5					3.0	10.7		
Ta_2O_5							3.0	16.6
La_2O_3	4.9	21.2						
Y_2O_3			4.9	15.7				

Composition of Applicants' Ex. 31, 32, 33 and 34 (spec, pages 23 and 24)

	31		32		33		34	
Component	mol %	wt. %	mol %	wt. %	mol %	wt. %	mol %	wt. %
SiO_2	92.0	75.5	92.0	74.9	92.0	72.1	92.0	75.1
Yb_2O_3	2.0	10.8	2.0	10.7	2.0	10.3	2.0	10.7
ZrO_2	3.0	5.1	3.0	5.0	3.0	4.8	3.0	5.0
HfO_2	3.0	8.6						
WO_3			3.0	9.4				
La_2O_3					3.0	12.8		
Y_2O_3							3.0	9.4

Composition of Applicants' Ex. 36

	36	
Component	mol %	wt. %
SiO_2	92.0	70.3
Yb_2O_3	2.0	10.0
ZrO_2	3.0	4.7
La_2F_6	3.0	15.0

As can be seen from the conversion tables above applicants' example 25 has the highest wt. % of SiO_2 of all of applicants' exemplary glass compositions that have 88.1 or 92 mol % of SiO_2, namely 79.3 wt. %. However 79.3 wt. % of SiO_2 is still below the lowest amount of SiO_2 disclosed in Anderson, namely 80 wt. %.

The aforesaid calculations thus provide evidence that the applicants' claimed glass compositions with less than 92 mol % of SiO_2 do not have concentration ranges for SiO_2 that overlap or touch the concentration range of greater than 80 wt. % disclosed in Anderson.

For the aforesaid reasons and because of the changes in the claims, withdrawal of the rejection of claims 38, 40 to 47 and 81 as obvious under 35 U.S.C. 103 (a) over U.S. 6,800,574 (Anderson) is respectfully requested.

Furthermore it is respectfully submitted that new dependent claims 84 to 86 are not obvious under 35 U.S.C. 103 (a) over U.S. 6,800,574 (Anderson).

III. OBVIOUSNESS BASED ON ANDERSON AND KUNERT

Claims 49, 50, 82 and 83 were rejected under 35 U.S.C. 103 (a) over U.S. Patent 6,800,574 issued to Anderson, and further in view of U.S. Patent 6,297,181, issued to Kunert, et al.

Kunert, et al, was only cited as teaching the X-ray opaque glass powder mean grain size and the silanized surface.

Furthermore Kunert, et al, does not motivate one skilled in the art to modify the

disclosures in the primary reference, Anderson, that are necessary to arrive at applicants' claimed invention because it provides no reason to employ the lower amounts of SiO_2 that are used in applicants' X-ray opaque glass composition. Andersons' range for SiO_2 is greater than 80 wt. % and Kunerts' range for SiO_2 is 20 to 40 wt. %, but applicants' amounts of SiO_2 are between these ranges as shown in part by the tables above for the individual examples.

In addition, applicants' claims exclude oxide ingredients that are required in the glass of Kunert, et al, such as Al_2O_3, ZnO and B_2O_3. Thus applicants' teach against a combined glass composition comprising the concentration ranges of both prior art references.

It is especially important to remember that the statute (35 U.S.C. 103) requires that the source of the reasons that one skilled in the art would modify the disclosures of the primary reference to arrive at the claimed invention cannot be the applicants' specification and that the reasons must have been apparent at the time the invention was made by the applicants. For example, the Federal Circuit Court of Appeals has said:

> "As in all determinations under 35 U.S.C. 103, the decision-maker must bring judgment to bear. It is impermissible, however, simply to engage in a hindsight reconstruction of the claimed invention, using the applicant's structure as a template and selected elements from references to fill the gaps". ***In re Gorman***, 18 U.S.P.Q. 2nd 1885 (Fed. Cir. 1991).

Kunert provides no reasons to one skilled in the art to modify the disclosures of the primary reference Anderson to arrive at the invention claimed in applicants' amended and new claims.

For the aforesaid reasons and because of the changes in the claims, withdrawal of the rejection of claims 49, 50, 82 and 83 as obvious under 35 U.S.C. 103 (a) over U.S. 6,800,574 (Anderson), and further in view of U.S. Patent 6,297,181, issued to Kunert, et al, is respectfully requested.

Furthermore it is respectfully submitted that claims 38, 40 to 47, 81 and 84 to 86 are not obvious under 35 U.S.C. 103 (a) over U.S. 6,800,574 (Anderson), and further in view of U.S. Patent 6,297,181, issued to Kunert, et al.

Should the Examiner require or consider it advisable that the specification, claims and/or drawing be further amended or corrected in formal respects to put this case in condition for final allowance, then it is requested that such amendments or corrections be carried out by Examiner's Amendment and the case passed to issue. Alternatively, should the Examiner feel that a personal discussion might be helpful in advancing the case to allowance, he or she is invited to telephone the undersigned at 1-631-549 4700.

In view of the foregoing, favorable allowance is respectfully solicited.

Respectfully submitted,

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